

I claim:

1. A method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media, said tank having a closed top, a closed bottom and a height that is greater than its diameter, said method comprising the following steps:

flowing the liquid being treated into the center of said tank adjacent the bottom of said tank;

dispersing the liquid that has flowed into the center of said tank radially outwardly from said center of said tank toward the periphery of said tank;

flowing the dispersed liquid upwardly over essentially the entire cross section of said tank and treating the liquid while it flows upwardly;

collecting the treated liquid at the center of said tank adjacent the top of said tank;

isolating the collected treated liquid from the rest of the liquid in said tank in a conduit at the center of said tank;

flowing the isolated treated liquid downwardly toward the bottom of said tank through said conduit at the center of said tank; and

discharging the treated liquid from said tank adjacent the bottom of said tank.

2. The method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media as defined in claim 1, further comprising flowing said liquid upwardly above the bottom of said tank before dispersing said liquid radially outwardly toward the periphery of said tank.

3. The method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media as defined in claim 1, further comprising flowing said liquid upwardly above the bottom of said tank through a second conduit that is coaxial with and surrounds said conduit at the center of said tank.

4. The method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media as defined in claim 3, further comprising collecting settled solids at the bottom of said tank in a third conduit that is coaxial with and surrounds said second conduit.

5. The method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media as defined in claim 1, further comprising sealing said tank to the atmosphere, except for an influent inlet, an effluent outlet and a waste outlet.

6. The method of treating a liquid in a cylindrical liquid treatment tank that is devoid of solid liquid treatment media as defined in claim 1, further comprising discharging the treated liquid from said tank below where the liquid being treated is dispersed radially outwardly.

7. A method of removing hydrogen sulfide by precipitation from potable water that contains hydrogen sulfide, comprising the following steps:

flowing hydrogen sulfide containing potable water into a vessel;

pressurizing and oxygenating the hydrogen sulfide containing potable water in said vessel for sufficient time to precipitate some, but not all, of the sulfur from said potable water;

then flowing the partially treated and still oxygenated hydrogen sulfide containing potable water into the center adjacent the bottom of a pressurized water treatment tank that is devoid of solid liquid treatment media;

dispersing the partially treated water that has flowed into the center of said tank radially outwardly from said center of said tank toward the periphery of said tank;

flowing the dispersed partially treated water upwardly over essentially the entire cross section of said tank for sufficient time to fully treat the water while it flows upwardly by precipitating additional sulfur particles;

collecting the fully treated potable water at the center of said tank adjacent the top of said tank;

isolating the collected fully treated potable water from the partially treated potable water in said tank in a conduit at the center of said tank;

flowing the isolated fully treated potable water downwardly toward the bottom of said tank through said conduit at the center of said tank;

discharging the fully treated potable water from said tank adjacent the bottom of said tank;

collecting precipitated sulfur particles at the bottom of said tank; and discharging the collected sulfur particles from said tank.

8. The method of removing hydrogen sulfide by precipitation from potable water containing hydrogen sulfide defined in claim 7, further comprising flowing said partially treated potable water upwardly above the bottom of said tank before dispersing said liquid radially outwardly toward the periphery of said tank.

9. The method of removing hydrogen sulfide by precipitation from potable water containing hydrogen sulfide defined in claim 7, further comprising flowing said partially treated potable water upwardly above the bottom of said tank through a second conduit that is coaxial with and surrounds said conduit at the center of said tank.

10. The method of removing hydrogen sulfide by precipitation from potable water containing hydrogen sulfide defined in claim 9, further comprising collecting settled sulfur particles at the bottom of said tank in a third conduit that is coaxial with and surrounds said second conduit.

11. The method of removing hydrogen sulfide by precipitation from potable water containing hydrogen sulfide defined in claim 7 further comprising sealing said tank to the atmosphere, except for a partially treated potable water inlet, a fully treated potable water outlet and a precipitated sulfur particle outlet.

12. The method of removing hydrogen sulfide by precipitation from potable water containing hydrogen sulfide defined in claim 7, further comprising further comprising discharging the fully treated potable water from said tank below where the partially treated potable water is dispersed radially outwardly.

13. A method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide, comprising the following steps:

flowing the partially treated hydrogen sulfide containing potable water into the center adjacent the bottom of a pressurized water treatment tank that is devoid of solid liquid treatment media;

maintaining the pressure and oxygenation in said tank at levels sufficient to precipitate the remaining sulfur from the partially treated potable water;

dispersing the partially treated potable water that has flowed into the center of said tank radially outwardly from said center of said tank toward the periphery of said tank;

flowing the dispersed partially treated potable water upwardly over essentially the entire cross section of said tank for sufficient time to enable the pressure and oxygenation levels in said tank to fully treat the potable water while it flows upwardly by precipitating all remaining sulfur particles;

collecting the hydrogen sulfide free potable water at the center of said tank adjacent the top of said tank;

isolating the collected hydrogen sulfide free potable water from the partially treated potable water in said tank in a conduit at the center of said tank;

flowing the isolated hydrogen sulfide free potable water downwardly toward the bottom of said tank through said conduit at the center of said tank;

discharging the hydrogen sulfide free potable water from said tank adjacent the bottom of said tank;

collecting precipitated sulfur particles in a sump at the bottom of said tank; and

discharging the collected sulfur particles from said sump.

14. The method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide defined in claim 13, further comprising flowing said partially treated potable water to above the bottom of said tank before dispersing said partially treated potable water radially outwardly toward the periphery of said tank.

15. The method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide defined in claim 13, further comprising flowing said partially treated potable water upwardly above the bottom of said tank through a second conduit that is coaxial with and surrounds said conduit at the center of said tank.

16. The method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide defined in claim 15, further comprising collecting precipitated sulfur particles at the bottom of said tank in a third conduit that is coaxial with and surrounds said second conduit.

17. The method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide defined in claim 13, further comprising sealing said tank to the atmosphere, except for a partially treated potable water inlet, a hydrogen sulfide free potable water outlet and a precipitated sulfur outlet sump.

18. The method of removing residual hydrogen sulfide from partially treated potable water that still contains some hydrogen sulfide defined in claim 13, further comprising further comprising discharging the hydrogen sulfide free potable water from said tank below where the partially treated potable water is dispersed radially outwardly.